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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,121	06/30/2006	Tsukasa Maruyama	21713-00032-US1	8319
30678 7590 03/03/2011 CONNOLLY BOVE LODGE & HUTZ LLP 1875 EYE STREET, N.W. SUITE 1100 WASHINGTON, DC 20006			EXAMINER CHAN, HENG M	
			ART UNIT 1728	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/585,121	<b>Applicant(s)</b> MARUYAMA ET AL.	
	<b>Examiner</b> HENG M. CHAN	<b>Art Unit</b> 1728	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(c)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Application***

Applicant's amendments and remarks filed 12/21/2010 have been acknowledged. Claims 1-20 are pending.

The previous rejections have been withdrawn after considering Applicants' declaration and exhibits.

### ***Claim Objections***

1. Claim 9 is objected to because "a metal oxide" inline 2 should be changed to "the metal oxide." Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 5 recites a counter electrode and "a conductive substrate of the photovoltaic device" of claim 6 seems to refer to a constituent in addition to the elements claimed in claim 5. However, the conductive substrate of claim 6 is described in the specification as the counter electrode. It is therefore unclear whether the conductive substrate of claim 6 is the same or different as the counter

electrode of claim 5. For examination purposes, the conductive substrate of the photovoltaic device is considered to be the counter electrode.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**3. Claims 1-5 and 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable by WO 2004/017452 to Yoshikawa et al. (English equivalent US 2005/0260786 used for citation), in view of US 5,188,768 to Sotomura.**

Regarding claim 1, Yoshikawa et al. teach an electrolyte comprising a oxidation-reduction substance containing an ionic liquid, e.g. 1,2 dimethyl-3-propylimidazolium iodide, carried by a vulcanized rubber containing clay (abstract; [0112]; [0200-0207]).

Yoshikawa et al. do not expressly teach a layered clay mineral and/or an organically modified layered clay mineral.

Sotomura also relates to an electrolyte and teaches that the electrolyte comprises a layered compound, for example, a clay material, such as silicates including montmorillonite, nectolite, saponite, and smectite (column 1, lines 53-68; column 3, lines 52-54).

It would have been obvious to one of ordinary skill in the art at time of invention to have used a layered clay mineral instead of clay in the electrolyte of Yoshikawa et al.

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because Yoshikawa et al. teach using clay in the electrolyte and so the skilled artisan would have looked into the prior arts like Sotomura for known clay materials used in electrolytes. The limitation reciting “for a photovoltaic device” is a recitation of intended use in the preamble. It must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See MPEP § 2111.02. Yoshikawa et al. teach an electrolyte for a photovoltaic device (abstract).

Regarding claims 2 and 3, the instant claims are product-by-process claims and product-by-product claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP § 2113. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). See MPEP § 2112.01. In this case, Yoshikawa et al. teach that the ionic liquid is carried on the clay (abstract; [0112]; [0200-0207]) and Sotomura teaches that the clay material is ion-exchanging (column 1, lines 53-68; column 3, lines 52-54).

Regarding claims 4, 10, and 12, said ionic liquid is an imidazolium salt (abstract; [0200-0207]).

Regarding claims 5, 11, 13, and 14-16, Yoshikawa et al. teach a photovoltaic device comprising a photoelectrode including a transparent conducting layer and a metal oxide semiconductor film, a counter electrode arranged facing said photoelectrode and an electrolyte layer arranged between said photoelectrode and said counter electrode, wherein electrolyte layer is an electrolyte according to claims 1-4, respectively (Figs. 1 and 3-5; [0007]; [0247]; [0250]; [0280]; [0282]). Yoshikawa et al. teach using porous TiO<sub>2</sub> particles having a primary particle diameter of 30 nm in the metal oxide semiconductor film ([0466-467]); the metal oxide semiconductor film has to be mesoporous.

Regarding claim 9, Yoshikawa et al. teach a dye-sensitized solar cell comprising a photovoltaic device according to claim 5 and a photosensitizing dye carried on the metal oxide semiconductor mesoporous film of the photovoltaic device ([0007]).

**4. Claims 6-8 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al. as applied to claims 1 and 5 above, in view of US 2005/0072462 to Kang et al.**

Regarding claims 6-8 and 17-20, the claimed conductive substrate is considered to be the counter electrode of claim 5 and its structure is a conductive polyaniline coating on a substrate. Yoshikawa et al. teach a counter electrode 4 (abstract).

Yoshikawa et al. do not expressly teach that the counter electrode is obtained by coating, on a substrate, a conductive polyaniline dispersion as claimed.

Kang et al. also relate to a photovoltaic device and teach a counter electrode coated with polyaniline (abstract; [0024]).

It would have been obvious to one of ordinary skill in the art at time of invention to have used a counter electrode coated with polyaniline like that of Kang et al. in the photovoltaic device of Yoshikawa et al., because the skilled artisan would have used a conventionally used counter electrode in the same device and would have obtained expected results. A photovoltaic device or dye-sensitizing solar cell comprising the counter electrode would have also been obtained. Product-by-product claims 6-8 and 17-20 are not limited to the manipulations of the recited coating and polymerization steps, only the structure implied by the steps. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP § 2113. Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). See MPEP § 2112.01.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection. The Examiner reconsidered the term “ionic liquid” and supplemented a newly discovered reference to Yoshikawa et al., who

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teach an electrolyte for a photovoltaic device comprising an ionic liquid and clay, with Sotomura, who teaches using a layered clay mineral in an electrolyte. The combination of references would have resulted in the claimed electrolyte and a photovoltaic device such as a dye-sensitized solar cell comprising the claimed electrolyte.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HENG M. CHAN whose telephone number is (571)270-5859. The examiner can normally be reached on Monday to Friday, 9:30 am EST to 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer K. Michener can be reached on (571)272-1424. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer K. Michener/  
Supervisory Patent Examiner, Art Unit 1728

/HENG M CHAN/  
Examiner, Art Unit 1728